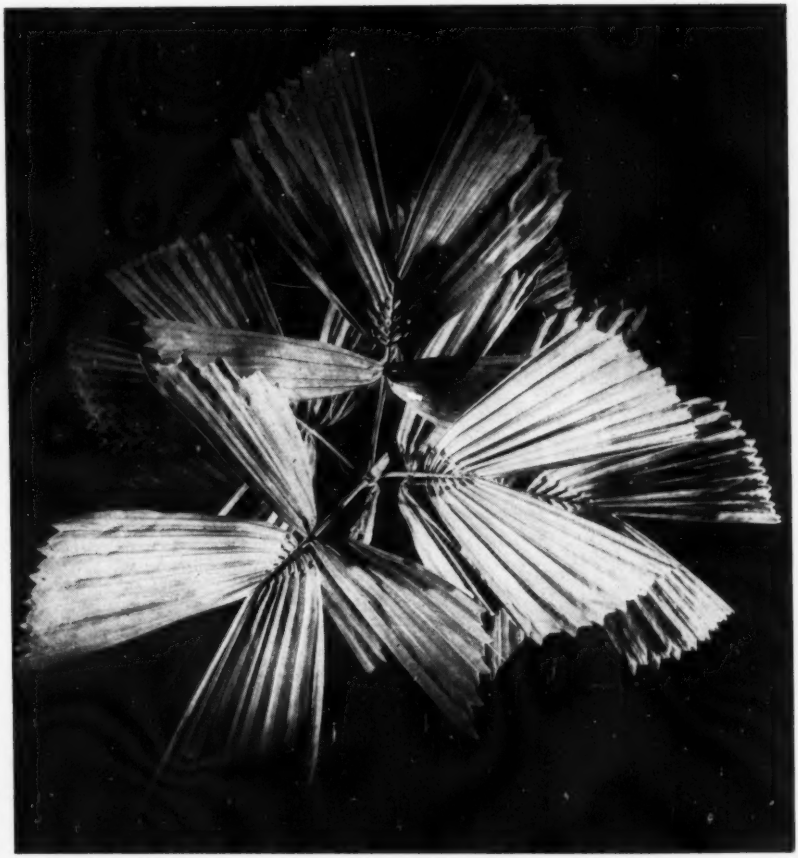
PRINCIPES

JOURNAL OF THE PALM SOCIETY



VOLUME I JULY, 1957 NUMBER 4

THE PALM SOCIETY

A non-profit association primarily engaged in the study of the palm family in all its aspects throughout the world. The Society relies on voluntary contribution for support, and membership is open to all persons interested in the family. Requests for information about membership or for general information about the Society should be addressed to the Executive Secretary.

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PRINCIPES

Journal of the Palm Society

An illustrated quarterly devoted to information about palms published on the first day of January, April, July, and October, and sent free to members of the Palm Society.

EDITOR: Harold E. Moore, Jr.

EDITORIAL BOARD: Paul H. Allen, David Barry, Jr., I. D. Clement, Walter H. Hodge, Eugene D. Kitzke, Harold F. Loomis, Nixon Smiley, Dent Smith.

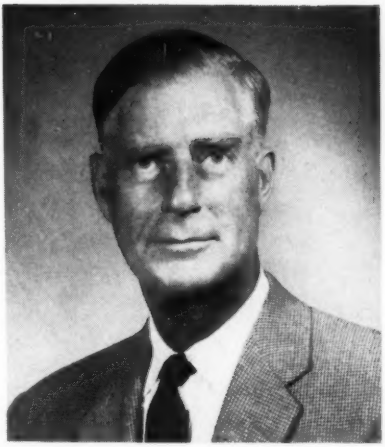
Manuscript for *Principes*, including legends for figures and photographs, must be typed double-spaced on one side of 8½ x 11 bond paper and addressed to the Editor at Bailey Hortorium, Mann Library, Cornell University, Ithaca, New York, for receipt not later than 45 days before date of publication. Authors of one page or more of print will receive six copies of the issue in which their article appears. Additional copies or reprints can be furnished only at cost and by advance arrangement.

COVER PICTURE

Looking down at the crown of REINHARDTIA GRACILIS variety ROSTRATA from Costa Rica introduced by R. G. Wilson and grown at Longwood Gardens, Kennett Square, Pennsylvania. Longwood Gardens photo by G. Hampfler.

Mailed at Miami, Florida, July 15, 1957

Dent Smith, "Palmateer"



In the short 18 month period that The Palm Society has been in existence this voluntary organization has blossomed from a seedling nourished by only a score or more members to a robust plant still growing on the enthusiasm of almost 300 palm lovers. Starting in January, 1956, with informal processed bulletins it now finds itself, a year and a half later, completing the first letter-press volume of its new quarterly journal, *Principes*.

It is doubtful if all the members of our thriving young Society know how much its very existence and sustenance until now have been due to the devotion, enthusiasm, and "drive" of one man, Dent Smith, palmateer (as he would call himself) extraordinary, who until April of this year not only founded the Society but also served as its first president and able editor of its infant publications. If it were not for his generosity *Principes* would not exist or be continuing today.

Probably only Dent Smith can tell us when that sudden "love-at-first-sight" for palms came upon him. It certainly was not in his early youth for palms do not constitute a part of the temperate flora of Virginia, West Virginia, and New York, states which served mainly as schooling grounds during his early youth. In 1920, while scouting for oil in Mexico, he must have seen palms. Likewise a few years later when, at the age of 26, he went to Palm Springs "for nine months to explore the desert, but for groceries had to hire out as a taxi cab driver when not exploring"!

Of importance to the Society is the fact that Dent Smith found himself about 1930 when he set up his own investment house in New York City. This permitted early retirement in 1939 which in turn made it possible for him to devote much of his time to his new hobby of growing trees. During those early years of his investment business an innate love of arborescent plants first showed itself. He began personal arboretums of sorts both in New Jersey and Vermont collecting broad-leaved and coniferous trees as his specialties. Note that he prefers the grandeur of trees; plants outstanding for flowers do not give him the same appeal. Indeed Dent has often affirmed his preference for "noble" plants.

I am sure our first president feels that palms are the noblest of all trees. He found them all right in Florida where, in 1949, he went to live permanently. Soon afterwards Dent Smith must have caught palm fever for in 1950 he had already planted palms on his own new place at Daytona Beach. He began scouring the immediate area for these noble plants; extended his search to Orlando and farther south, where in Coconut Grove he found those "gold mines" of palms, the Fairchild Tropical Garden and the U.S.D.A. Plant Introduction Garden (Chapman Field). That his interest in palms was more than casual is shown in a 1953 letter to Mr.

H. F. Loomis of Chapman Field, who had encouraged him in his palm collecting efforts.

"I am experimenting now with palms in order to learn what species can be grown successfully here [Daytona Beach]. Such palms as *Chrysalidocarpus lutescens* and even *Scheelea*, planted in the open here, have withstood the winter without any damage, but we have not had a frost to test them. Anyhow, in my small way, I hope to add to the existing knowledge about the hardiness of certain palms and their adaptability to soil conditions here, if I can obtain enough different species to work with. I now have 32 species but to add to this number through the nurseries hereabouts seems impossible."

Where all this has brought Dent Smith today in his own garden is summarized in his article in the last issue of this journal (Palms at a High Latitude in Florida, *Principes* 1: 104-114, April, 1957).

To most men it would have been sufficient to plant and enjoy their own garden. But in 1955 Dent Smith was wondering out loud to palm-growing friends why, in a world of plant societies, "the palms, one of the world's most important plant families, have been neglected." Since there was no good reason why not, an informal society was proposed. We all know the rest. But what we do not all perhaps know is that for the first six months Dent Smith literally bore all responsibilities of the new Society's operations. His enthusiasm for palms is contagious and it is seen bubbling over in the issues of the Society's first publications, both bulletins and *Principes*. Combined with his love for this group of plants goes outstanding editorial ability. The combination of these two qualifications helped make the new journal an immediate success as is being reflected in burgeoning Society membership.

New officers are now charged with seeing that The Palm Society continues advancing. Only by growing can the fledgling reach that point where it can demonstrate in self-sufficiency the great debt that it owes this one man.—W.H.H.

Dent Smith

Director and Past President

Born 1897, Staunton, Virginia. Attended public schools in Charleston, W. Va., and Chicago; Grace Church School, New York; Charlotte Hall, Md., Augusta Military Academy, Va., Army and Navy Preparatory School, Washington, D. C., and finally at 16 entered junior year of college (Auburn, Alabama). Left this last at end of first semester, while still 16, which ended his formal schooling. As a boy he worked during vacations from his 9th year onward at numerous tasks, the first of which was as a soloist in a nickelodeon. Next was the Kelly Axe Factory, stamping the name and weight on axe heads, followed by office boy Armour & Co., Union Stockyards, Chicago; cub reporter Charleston (W. Va.) Gazette; clerk in bookshop; newspaper subscription solicitor; cook's helper in dogwagon; armature winding at Cabin Creek coal mine. After leaving college, he worked for a few months as a staff reporter on Charleston *Gazette*, then as backrodman on surveying gang, Virginian Power Co.

At 18 he enlisted for 7 years in Regular Army, March, 1916, when Villa raided Columbus, New Mexico. Stationed first at Douglas, Arizona, he served his

enlistment in Arizona, New Mexico and Texas mostly on the Mexican border, and in May, 1919 was furloughed to the Regular Army Reserve as a First Sergeant, at San Antonio. He then returned to Arizona where he mucked high-grade copper ore in the Old Dominion mine, Globe; later worked as electrician's helper on crane in converter pit, International Smelter, Miami, Ariz., and later as switchman on slag train at same smelter. The following year (Nov. 1920) he went to Tampico, Mexico, where he was hired as an oilfield scout and was stationed at Pánuco, Veracruz and later at Agua Nacida. Ill with malaria, he went to Mexico City to recover his health, working there as a flunky in the Hospital General for 50c gold per diem.

In September, 1921, he married Guadalupe Hopper y Martínez at San Luis Potosí. Worked for a time as a reporter for *La Prensa* (till the paper went bankrupt), Tampico, and then for 8 months manufactured Smith's Genuine Greenleaf Maple Syrup from sugar, water and mapeline—a business carried on by others ever since with some success. Scouted the Pánuco fields once more for a year, and in June. 1923 left Mexico for southern California. where he worked as a house-to-house canvasser selling building lots, pianos, sandwich-vending machines, vacuum cleaners, model T Ford cars, oil leases, etc. Went to Palm Springs for 9 months to explore the desert, but for groceries had to hire out as taxicab driver when not "exploring." Omitting a few California episodes too painful for print, he migrated cross-country to New York in 1925 and worked for the next five years as a bond salesman for an investment banking house in Wall Street.

Early in 1930 he founded Dent Smith and Company, over-the-counter dealers in investment securities, and in this endeavor found himself in the kind of work for which, temperamentally and otherwise, he was perfectly fitted. In 1939 he decided to retire so as to give more time to his collections, begun in 1935, of broadleaf trees and conifers, and to do some writing. The change was abrupt; he dissolved all his corporate ties, resigning his posts as President of Dent Smith and Company, President of Transportation & General Securities Co., Chairman of the Board of Duluth-Superior Transit Co., and as a Director of Erie Coach Company, Fort Worth Transit Co. and several others. Growing restless in retirement, he founded the magazine *Encore*, a monthly with nationwide distribution, publishing and editing it from 1942 to 1945. Thereafter he confined his attention to his tree collections in New Jersey and Vermont until 1949, in which year he came to live permanently in Florida.

THE SOCIETY'S FIRST SECRETARY AND TREASURER

The Society is greatly indebted, also, to its first Secretary, Mrs. W. W. Hargert of Ormond Beach, who was present at the organization meeting on April 17th, 1956, and ably carried out the duties of recording and corresponding secretary during the Society's first year of official existence. She and the late Mr. Hargert were among the Society's first and most enthusiastic members.

Miss Margueriete Martin accepted the responsibility of the office of Treasurer for the first year. She also assisted the President in the arduous tasks of preparing and mailing out the Bulletins, sending information to prospective members and other tedious but necessary tasks.

To both of these ladies goes a tremendous vote of thanks and appreciation from the Society as a whole.

L.H.W.

Comments by the Past President

From a nucleus of only about a dozen persons, the Society had acquired by April 16, 1957 a total of 269 members in many states and abroad, all in the short space of 17 months. This growth has been phenomenally fast for a plant society starting from scratch.

During the short time referred to, several things have been accomplished. We have already made a dent in the great wall of scant information that separates us from a fuller understanding of the *Palmae;* and though it is only a small dent, it is at least a beginning in the effort to be much better informed about the palms themselves and everything concerning them. On this score I have been much impressed by the remark of one nurseryman who has been growing palms and doing landscape work with them for the past 27 years: he said that because of The Palm Society he had learned "more about palms in one year than in all the rest of the 27 years put together." His statement should be credited, but we should not flatter ourselves into thinking that the Society itself has taught him very much in one year. The gain to him, it would seem, has come from having his attention more closely centered on the palms by the Society's work; by his perception of the increased interest in the palms on the part of gardeners and a very evident greater awareness even on the part of the public; and his attention has been focussed all the more on the palms because of enormously increased sales stimulated by the Society's activities. He has learned more because his own interest has been sharpened.

As everyone already knows, enthusiasm is infectious. The warmth generated by the Society's will-to-know has radiated out far beyond its small membership, and it is already manifest that interest in the palms has been revived in many old quarters and aroused in new.

Our greatest accomplishment, as I see it—or perhaps it should be termed a stroke of luck—was to secure the services of our new Officers and new Editor. In the person of the Editor we have the taxonomist who has chosen to continue the late eminent Dr. Bailey's work with the palms, and this fact should lead us on the road to a much more satisfactory state of knowledge and comprehension of them. Up to this point it has been unsatisfactory, fragmentary, confused or almost chaotic beyond the clear gains made in the last two centuries.

I could cite other accomplishments of the past year, but refrain. Our past as an organization is short and inconsequential, but the future is long and full of promise. We should be concerned with it. We are only at the threshold of any extensive or full knowledge of the palms, and in aspects not botanical the field is still virgin. The room for accomplishment is boundless, and we now have the machinery for making the endeavor. This machinery, however, cannot function without maintenance, and in our case maintenance means enough money to carry out our objectives and pay our expenses. It is our one sore problem, if the experience of the past year is any guide. It can be effectively answered by obtaining enough members to assure solvency. Trite though it may sound, new members are the life blood of the Society. Fortunately the world is wide and we have not yet scratched its surface, so there is ample room for the belief that we can acquire all the members needed to make survival certain. The course to follow is plain: let's get them. Success and also achievement lie that way.

D.S.

Treasurer's Annual Report

Section 13 of the Society's Bylaws requires the Treasurer to submit an annual report to the members, and accordingly I am making my report below.

No accounting is being made for the period of operation prior to April 17, 1956, which was from November 21, 1955 to that date, because all the expenses of organization and operation were assumed and paid by Mr. Dent Smith. There were no officers during that period. This accounting covers the year beginning April 17, 1956, when officers were elected by the members, and ending April 16, 1957.

Except for a small amount of stationery and supplies, the Society at the beginning of the yearly period had no assets and no liabilities. The members decided not to have any set dues and to rely instead upon voluntary contributions for the report of the Society. Such contributions were first solicited in late April, 1956, resulting in sufficient income to carry on the work for a time. Other contributions were received from new or old members throughout all the months of the year accounted for, thus enabling the Society promptly to meet all its bills as they fell due, but the income was insufficient to build up a cash reserve. In fact, at times the margin of safety was practically nil. The voluntary method of support, however, proved to be much more productive of revenue than a system of fixed dues would have been; for even if there had been annual dues of $10 and every member had paid them, there would have been a deficit from operations.

Here follows the income statement.

April 17, 1956 to April 16, 1957

RECEIPTS:		
Contributions	$2,731.50	
Advertising	20.50	$2,752.00
DISBURSEMENTS:		
Stationery and Supplies	$ 223.80	
Printing	1,314.59	
Mimeographing	452.53	
Travel	301.45	
Postage	215.67	
Telephone	51.76	
Miscellaneous	74.55	$2,634.35
Balance		$ 117.65

I have not made up a balance sheet for the reason that there were no legal liabilities whatsoever at the year end, and so a liabilities column would be confusing to anyone not familiar with technical accounting procedures.

ASSETS at April 16, 1957

Cash in bank	$117.65
Undeposited check (contribution)	50.00
Mimeographed Bulletins Nos. 1 through 6 at approximate cost	215.00
Back numbers of *Principes* at approximate cost	503.00
Engravings, unused, at cost	32.00
Engravings, used, written down	1.00
Furniture and fixtures	24.00
Total	$942.65

The large mimeographing expense was occasioned by the processing of letters, memoranda, rosters and two Bulletins (5 and 6). Disbursement for printing includes the cost of the first 3 issues of *Principes*. Expenses of travel ($301.45) and telephone ($51.76) totalling $353.21 were incurred by the then President, Mr. Smith; but in the realization that the Society could not afford these expenditures, he reimbursed it by a special donation of $400 on December 22, 1956.

On January 7, 1957, the Society submitted to the Director of Internal Revenue, Jacksonville, Florida, an application for tax exemption. On February 15th, 1957 we were advised that our application had been forwarded to the Washington Office for their consideration and reply. No ruling had been made on our application at April 16, 1957. Presumably our organization qualifies for tax exempt status under existing laws, but we can make no definite statement before we receive the ruling. In the meantime, members may claim a tax deduction for their contributions, but to date (April 29, 1957) there had been no positive assurance that such a claim may not be disallowed.

Any member of the Society may inspect the books if he so desires. They are now in the possession of my successor as Treasurer, Mr. Nat J. De Leon, at Miami.

Respectfully submitted,
(signed) Margueriete Martin

Sabal Minor In Pennsylvania

MARY G. HENRY

Most of us gardeners have an inquiring mind and like to try "new" plants. This trait seems to be rather strongly developed in my make-up and has led me on well over a hundred expeditions and into every state in the United States. These trips of several days to several months duration are mainly taken in order to collect the finest broad-leaved evergreen trees and shrubs, also the finest small deciduous trees and shrubs, for my gardens which are now known as the Henry Foundation for Botanical Research.

Some twenty-five years ago I dug a plant of *Sabal minor* from a woodland in Wilkes County, Georgia, along the Little River, near the Savannah River. This area has now vanished forever owing to the devastating effect of the Clark

Hill Dam. Alas, these so called modern improvements are anything but improvements in the eyes of conservationists.

I had not been aware that this small palm grew as far north, so I thought I would see if it could survive a Gladwyne, Pennsylvania winter. Sabals are difficult subjects to dig even under the most favorable circumstances. I had only a trowel with which to dig and there seemed to be no small, trowel-sized plants. However, I selected a smallish plant and did the best I could. It was planted in my "Southern Garden" on a sunny slope that faced the south. I gave the plant some protection but it died the first winter.

Years later, on April 6, 1948, when motoring in Le Flore County, Mississippi, I came to a meadow filled with the little *Sabal*. Hope springs eternally in a gardener's heart and a longing came to try this small palm again. Here, too, I could find no easily dug specimens, so selected the smallest I could find. The soil was a dark, very heavy, damp clay but this time we had a sharp spade. It took Ernest Perks, my gardener, a long time to dig it for the trunk went down nearly two feet.

This was planted in the same locality as my first *Sabal*, but the soil was prepared carefully and lightened with sand. Like my other one, I covered it with dry oak leaves when autumn came. That following spring, the little palm was still alive! It has now survived nine winters at Gladwyne.

In the autumn of 1951, I was on a rather extended expedition in the South Central and the Southeastern states in order to collect *Ilex* species. On December 1, to my great surprise, I found a small colony of *Sabal minor* in Cherokee County, Alabama. This is in the northern part of the state in Piedmont territory and the altitude is over 600 feet. Dr. Roland Harper, Alabama State Botanist for many years, told me that he had no knowledge of *Sabal minor* ever having been found in this part of the state. This one has come safely through six winters.

It was that beautiful southern shrub, *Pinckneya pubens*, that first gave me the courage to try *Sabal minor* in Pennsylvania. I grew the *Pinckneya* from seed and for ten long years it died to the ground each winter. After that a two inch growth survived. Success finally came and it has never winter killed since then.

Our winters are fairly severe. The temperature usually falls three or four times to about 0°F., or below. During most of the winters *Sabal minor* has had some protection, depending on the kind of growing season it has had. If the spring has been a normal one with plenty of rain, it indicates the *Sabal* can have the early start that means a long growing season. Under these conditions and with the usual August and September dry spell, the leaves ripen until they are dry and firm enough to take a fairly rough winter bravely and with little, or sometimes no protection.

Sabal minor is a slow grower, even under happier conditions. But this past season, 1956, they have produced what is so far their largest leaves. As I write these notes we are having the coldest spell of weather that we have had in twenty-two years, with zero temperatures for seven straight days.

Will the little palms survive? Somehow I rather think they will.

The names of two contributors in this issue will be new to many readers of *Principes*. Mrs. Henry is a talented and enthusiastic gardener. She has introduced many unusual plants into her gardens, and her travels have taken her into unmapped parts of British Columbia where Mt. Mary Henry honors her.

Dr. A. J. Eames, whose article appears on page 146, is Professor Emeritus of Botany at Cornell University. His textbooks and technical articles on plant anatomy and morphology have brought him recognition throughout the botanical world. His recent publication on the palm leaf is noted on page 150.

Photo by Russell J. Seibert

TWO-HEADED *ROYSTONEA* on hill slope in cultivated area outside Anse d'Hainault on the southern peninsula of Haiti. It is reported that vines severed the bud causing this abnormal condition. The tree once had three heads.

The Genus Reinhardtia

HAROLD E. MOORE, JR.

A few fortunate gardeners today possess plants of one of the varieties of *Reinhardtia gracilis*, a small but intriguing palm with "windows" in the leaves. A similar but larger species, *R. latisecta*, was illustrated by M. A. Langlois in *Principes* 1:48, 1957. Three additional species belong in this unusual genus. All of them are suitable for cultivation and two species have been cultivated in times past under the name *Malortiea*. A technical study of the genus will shortly appear in *Gentes Herbarum*. A less formal approach, however, may provide readers of *Principes* with information about plants in cultivation, with the means of identifying them, and, in addition, may explain why we call the genus *Reinhardtia* today.

Reinhardtia in Nature and in Cultivation

The five recognized species of *Reinhardtia* occur in the tropical rain-forests of southern Mexico, Central America and northern Colombia. They are shade-loving palms requiring abundant moisture and, where I have seen them in Mexico and Costa Rica, are always on rather steep slopes in well-drained soil rich in humus. Most reinhardtias grow at low elevations from near sea-level to about 2,000 feet, though *R. elegans* and *R. gracilis* var. *tenuissima* are found at an altitude of about 3,000 feet.

There is far too little information regarding their requirements in cultivation. *Reinhardtia simplex* and one or more varieties of *R. gracilis* were grown in European and British greenhouses in the last century. The same two species were also cultivated at the Doheny Estate in Los Angeles, California, early in this century. New introductions have brought fresh stocks of *R. gracilis* varieties and *R. simplex* into the United States in recent years. Plants grown in the constant conditions of a warm greenhouse flourish when provided with rich humus soil, plenty of water and heat. In the open or under lath in Florida, they grow more slowly and appear to be sensitive to cold.

Further trials are needed to solve the problems of successful growing. Those species not yet in cultivation are certainly worth a serious attempt at introduction. The handsome appearance of *R. latisecta* has already been shown in *Principes*. *Reinhardtia elegans* would appear to deserve the epithet "elegant," and the diminutive *R. Koschnyana* is a prize to be sought. With the exception of *R. elegans*, plants eventually form clusters of several stems from an underground rhizome and thus may be propagated without seed.

Reinhardtia versus Malortiea

The first record of *Reinhardtia* appeared in 1845 when the Danish botanist Liebmann mentioned the name only in a list of Mexican palms he had collected. It was not until 1849 that a description of the single species, *Reinhardtia elegans*, appeared in Martius' *Historia Naturalis Palmarum*. Until 1889, it was supposed that this slender palm with evenly pinnate leaves was the only species of the genus. In the meantime, Hermann Wendland, Royal Gardener at Hannover, Germany, described a small Guatemalan palm of unusual habit noteworthy, among other characteristics, for the opening between the bases of pinnae that were otherwise united. It was called *Malortiea gracilis*; the generic name *Malortiea* coined in honor of Ernst von Malortie, Chief Marshal of the King of Hannover.

Later in the same year, 1853, Wendland described specimens of a second

species, also from Guatemala, to which he gave the name *Malortiea latisecta.*

A few years later, a third species from Costa Rica, *M. simplex,* was added to the genus and in 1901, *Malortiea Koschnyana,* one of the smallest of all palms, was described from specimens also collected in Costa Rica.

When Wendland amplified the description of *Malortiea* in describing *M. latisecta,* he noted a strong resemblance to the genus *Reinhardtia,* but because of the difference in leaves and supposed differences in flowers he maintained them apart as did Sir Joseph Hooker when he studied the genera for *Genera Plantarum.*

Oscar Drude, however, combined the two genera when he wrote the treatment of the palms for Engler and Prantl's *Die natürlichen Pflanzenfamilien.* Max Burret reached a similar conclusion when he studied the genera in 1932, though L. H. Bailey continued to separate them. Further study on my own part with more abundant material than was available previously, and augmented by observation of some species in Mexico and Costa Rica, confirms the propriety of uniting *Malortiea* with the earlier *Reinhardtia.*

Supposed differences based on inadequate specimens or erroneous observation disappear. Flowers are essentially similar in all species (fig. 1), and are unusual among palms in having the sterile stamens of the pistillate (female) flowers attached to the base of the petals, partially united in a ring, and often with the short remnants of the stalks or filaments protruding when the flower is fully opened (fig. 1 Cb). The degree of rumination (intrusion of the seed coat) of the endosperm has been found a poor distinction for genera when used alone. In *Reinhardtia,* the endosperm varies from strongly ruminate in *R. elegans* and *R. latisecta,* to weakly or not at all ruminate in the remaining species (fig. 2). A similar condition is found in other genera which have both types of endosperm, examples being *Drymophloeus, Euterpe, Ptychococcus, Ptychosperma* (which includes *Actinophloeus*), *Synechanthus,* and others less familiar. Even the leaf is seen to be of similar nature. Although the pinnae are all separated in *Reinhardtia elegans,* the narrow tips are toothed in the same manner as the tips of the segments that unite to make the leaf of other species as illustrated in fig. 3.

The Genus and its Species

Reinhardtia

Species of *Reinhardtia* are of moderate to very small size with smooth solitary stems, or more often with loosely clustered stems from an underground rhizome. Leaves have slender tubular sheaths of "woven" brown fibers which are most prominent opposite the petiole where they project upward in a short to rather long ligular structure when young, becoming frayed as the leaf ages. Blades are pinnate with numerous reduplicate pinnae or are pinnately nerved with segments partially or completely united. Pinnae and segments have numerous fine nerves and one principal central nerve which extends in a point at the toothed or two-pronged tip. When

Fig. 1. FLOWERS OF REINHARDTIA. A, *R. elegans.* Aa, flowering node (×5), Ab, pistillate flower and bracteole (×5), Ac, pistillate corolla (×5), Ad, pistillate corolla expanded to show staminodes (×5), Ae, bracteole (×5), Af, pistillate sepal (×5), Ag, pistil (×5), Ah, pistil in vertical section (×5), Ai, ovary in cross section (×10), Aj, staminate flower (×5), Ak, androecium (×5). B, *R. gracilis* var. *gracilis.* Ba, flowering node (×5), Bb, pistillate flower and bracteoles (×5), Bc, bracteole (×5), Bd, pistillate corolla (×5), Be, pistillate sepal (×5), Bf, pistillate corolla expanded to show staminodes (×5), Bg, pistil (×5), Bh, pistil in vertical section (×5), Bi, ovary in cross section (×10), Bj, staminate flower (×5), Bk, androecium (×5). C. *R. gracilis* var. *rostrata.* *Ca,* staminate flower (×5), Cb, pistillate flower at maturity (×5).

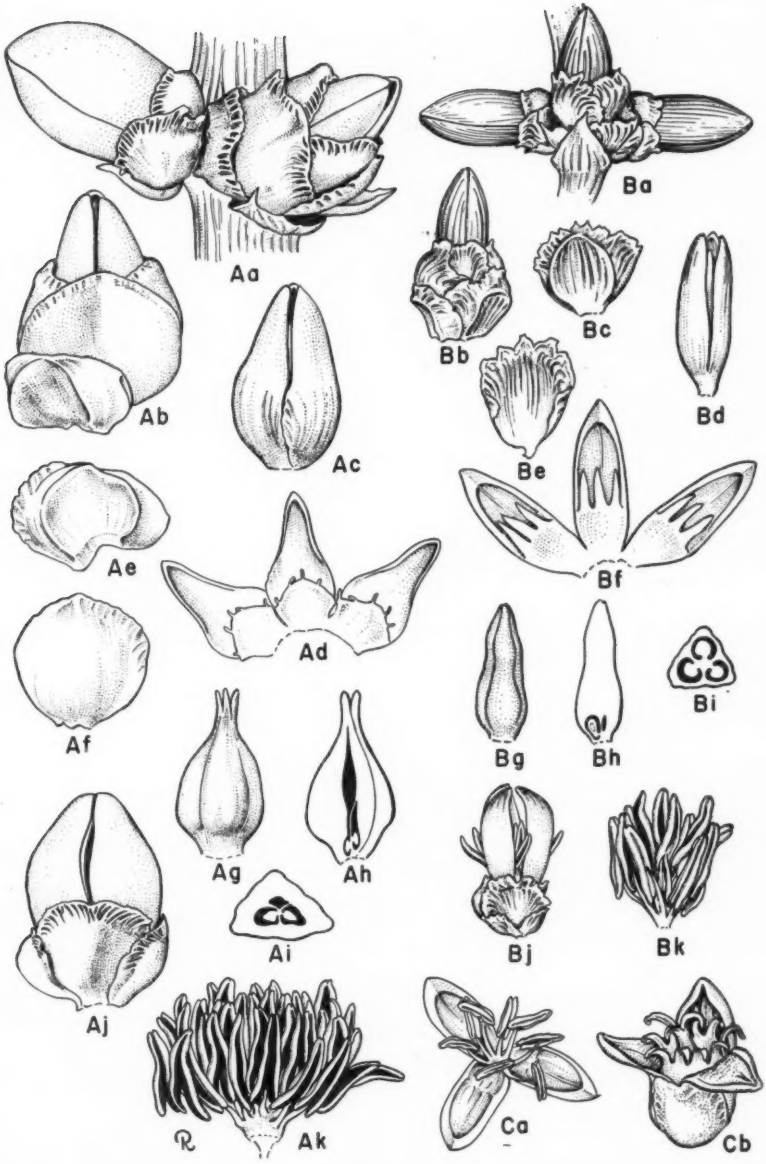


Fig. 1

segments are united, the margin of the leaf is obliquely and sharply cut. Before the blade expands, the points at the tips of the segments are united by a slender rein or lora which soon fragments (fig. 3G).

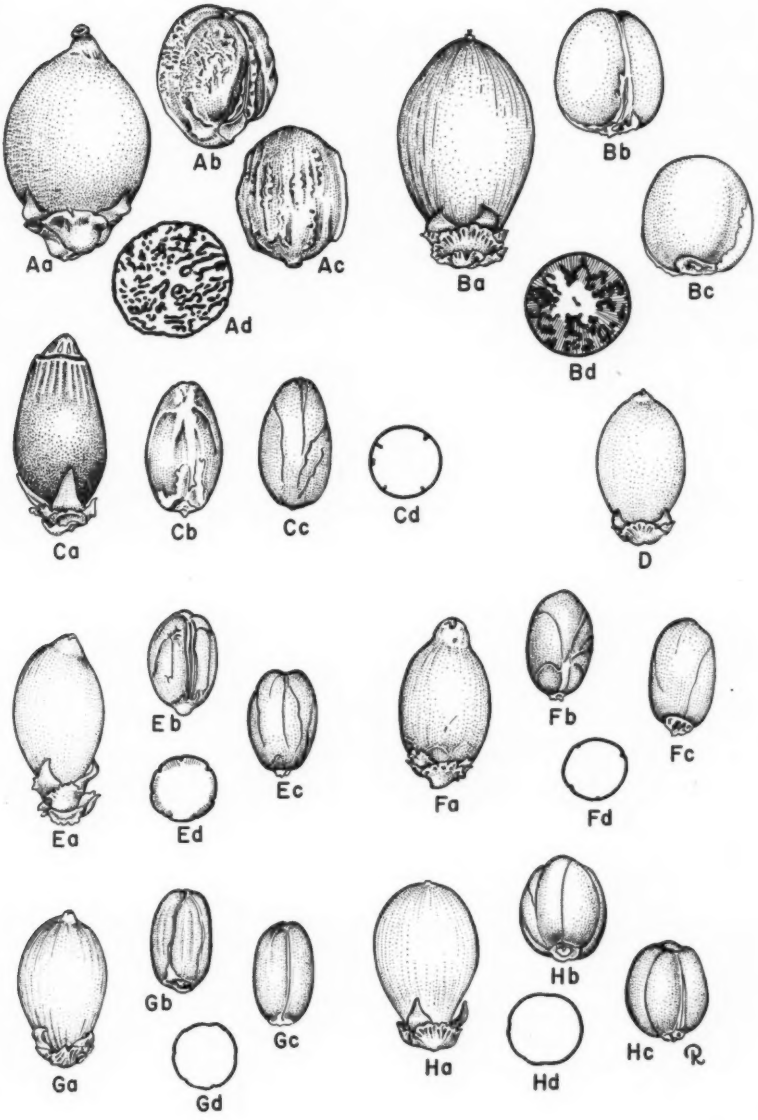
Inflorescences appear from the sheaths of the older leaves. Each is enfolded at first by two papery bracts attached close together at the base of the long peduncle. The outer of these bracts is short and open at the tip, seldom protruding beyond the sheath. The inner is longer, tubular, pointed, and at first completely encloses the inflorescence, then ruptures along one side as the peduncle elongates. Both bracts are usually persistent, the inner remaining attached though withering and fraying. The inflorescence is usually a panicle of few to many simple or forked or branched rachillae, but in one species it is spicate with only a single flowering axis developed. Rachillae are creamy white when in flower. As the fruit matures, however, they become thickened and bright orange-red in color.

Creamy-white flowers are borne in shallow depressions arranged in a spiral or more rarely nearly in two ranks along the rachilla. Each depression is subtended by and partially covered in bud with a pointed bractlet. These, for the most part, bear a staminate (male) flower on either side of a pistillate (female) which does not expand fully until the staminate flowers have fallen (fig. 1 Aa, Ba). At the tip of the rachilla, the pistillate flower may fail to develop leaving only paired or solitary staminate flowers. The slightly asymmetric staminate flowers (fig. 1 Aj, Ak, Bj, Bk, Ca) have a small, generally deciduous bracteole at one side of the base, three strongly imbricate sepals with rounded margins, and three valvate petals 2-3 times as long as the sepals. Stamens are 8-40. The short filaments are briefly united amongst themselves and to the base of the petals in an angled column, but above are distinct. They taper to linear anthers with deeply divided bases and tips with a single or double point. There is no evidence of a pistillode.

Symmetric pistillate flowers (fig. 1 Ab-i, Bb-i) are flanked by a pair of persistent bracteoles that are concave on the back. The sepals are strongly imbricate and frequently handsomely nerved. Petals are imbricate or partially united at the base but are valvate above. The grooved tips spread at maturity to show the slender free tips of staminodes that are otherwise united with each other and with the petals (fig. 1 Cb). The pistil consists of a short, soft, trilocular ovary bearing 1-3 ovules near the base of an axile placenta continued in a thickened grooved style, and 3 slender stigmas that recurve at maturity.

The ellipsoid, ovoid, or obovoid fruit (fig. 2) is small, smooth, deep purple or blackish when ripe, 1-seeded, and bears the style and remains of the stigmas in a very small to prominent point at its tip. The seed is attached to the thin shining endocarp either laterally along an impressed raphe or at the base, and is more or less sculptured by impressed vascular strands. The endosperm is ruminate or homogeneous with the embryo borne at the base.

Fig. 2. FRUITS OF REINHARDTIA. A, *R. elegans*. Aa, fruit (×2), Ab, Ac, seed (×2), Ad, seed in cross section (×2). B, *R. latisecta*. Ba, fruit (×2), Bb, Bc, seed (×2), Bd, seed in cross section (×2), C, *R. gracilis* var. *gracilis*. Ca, fruit (×2), Cb, Cc, seed (×2), Cd, seed in cross section (×2). D, *R. gracilis* var. *tenuissima*. Fruit (×2). E, *R. gracilis* var. *gracilior*. Ea, fruit (×2), Eb, Ec, seed (×2), Ed, seed in cross section (×2). F, *R. gracilis* var. *rostrata*. Fa, fruit (×2), Fb, Fc, seed (×2), Fd, seed in cross section (×2). G, *R. simplex*. Ga, fruit (×2), Gb, Gc, seed (×2), Gd, seed in cross section (×2). H, *R. Koschnyana*. Ha, fruit (×2). Hb, Hc, seed (×2), Hd, seed in cross section (×2).


Aa
Ab
Ac
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Ga
Gb
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Hd

Fig. 2

Species of *Reinhardtia* are divided into two subgenera distinguished in the key that follows. The key is constructed with emphasis on the leaf for ease in identification.

A. Petiole of the leaf densely and persistently brown-scurfy, not pale below or with a winged margin; stamens 27-40; seed attached laterally along an impressed raphe, the endosperm strongly and deeply ruminate ..... *Subgenus Reinhardtia*

B. Leaves with 38-40 one-nerved slender-tipped pinnae on each side of the rachis; stamens 35-40 or rarely as few as 28. Mexico. ..... *1. R. elegans*

BB. Leaves with 2-3 pinnae on each side of the rachis, the upper and lower pinnae several-nerved with openings between the segments along the rachis, broad and obliquely toothed along the outer margin; stamens about 27. Guatemala and British Honduras. *2. R. latisecta*

AA. Petiole pale and narrowly winged along the margin below, loosely covered with minute brown scales when young but soon becoming merely brown-dotted; stamens 8-22; seed attached basally, the raphe little or not impressed, the endosperm essentially homogeneous but often with minute shallow intrusions below the vascular strands ..... *Subgenus Malortiea*

C. Leaves without spaces or "windows" between segments along the rachis.

D. Apex of the leaf divided to a depth of 3/8-1 or rarely 1 1/2 in., the nerves 10-12 on each side of the rachis; some or all of the leaves usually with a pair of separate pinnae below the apical pair; inflorescence branched with 3-7 simple or rarely forked rachillae; stamens generally 14-17, perhaps as few as 12, or as many as 22. Honduras to Panamá. ..... *4. R. simplex*

DD. Apex of the leaf divided 1 3/4 - 2 3/8 or rarely only 1 3/8 in., the nerves 8-9 on each side of the rachis and the leaves never with separate pinnae below the apical pair; inflorescence spicate with only a single flowering axis; stamens 8-10. Costa Rica to northern Colombia. ..... *5. R. Koschnyana*

CC. Leaves with spaces or "windows" between most of the segments along the rachis and deeply cleft at the tip ..... *3. R. gracilis*

E. Staminate flowers 3/16 - 1/4 in. long with 16-22 stamens.

F. Leaves large, with 14-22 nerves on each side of a rachis 11-23 cm. long; rachillae 6-11, the lower often forked or branched, 2 3/4 - 11 1/2 in. long with 16-40 flowering nodes.
Guatemala and Honduras. ..... var. *gracilis*

FF. Leaves small, with 8-9 nerves on each side of a rachis 1 3/8 - 2 1/8 in. long; rachillae 2-3, simple, 1 9/16 - 2 in. long bearing 8-17 flowering nodes. Oaxaca, Mexico. ..... var. *tenuissima*

EE. Staminate flowers 1/8 - 5/32 in. long with 8-10 stamens.

G. Leaves with 8-11 nerves on each side of the rachis; fruit with a low apiculate crown; flowering nodes 6-17 arranged in a loose spiral on the rachilla.
Southern Mexico to Honduras. ..... var. *gracilior*

GG. Leaves with 11-15 nerves on each side of the rachis; fruit with a prominent blunt crown about 3/32 in. high; flowering nodes 16-37 arranged more or less in 2 ranks at least above the base of the rachillae. Eastern Nicaragua and Costa Rica. var. *rostrata*

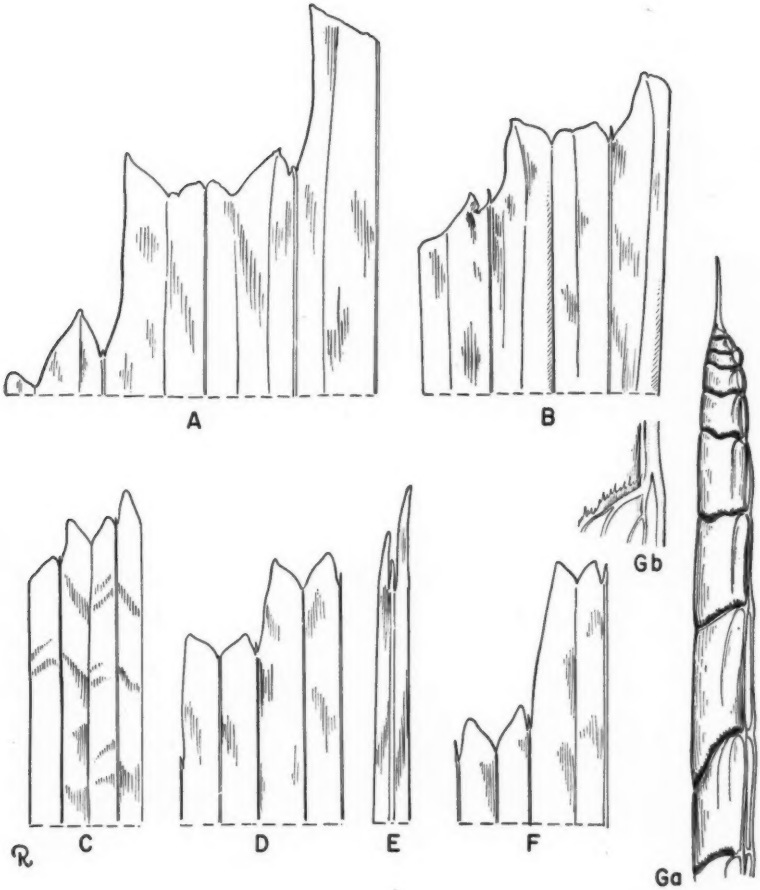

Fig. 3

LEAF MARGINS AND LORAE OF REINHARDTIA. A, *R. gracilis* var. *gracilis*. Portion of leaf margin (×2). B, R. gracilis var. tenuissima. Portion of leaf margin (×2). C, *R. simplex*. Portion of leaf margin (×2). D, *R. Koschnyana*. Portion of leaf margin (×2). E, *R. elegans*. Apex of pinna (×2). F, *R. latisecta*. Portion of leaf margin (×2). G. *R. gracilis* var. *rostrata*. Ga., portion of unexpanded leaf to show lorae (×2), Gb, attachment of individual segment to lora enlarged.

1. REINHARDTIA ELEGANS (figs. 1A, 2A, 3E, 4, 5).

Solitary erect stems of *R. elegans* may reach a height of nearly 20 feet, but bear fruit when much smaller. Ten to twelve leaves with stout sheaths about 10 in. long, crown the upper part of the stem. The graceful blades are slightly more than 3 ft. long from persistently brown-scurfy, wingless petioles about 1 ft. long, and have 38-40 narrow tapered dark green pinnae at regular intervals of an inch or more along each side of the rachis. Larger pinnae at the middle of the leaf measure to 16-17 in. long, 5/8 in. wide. Those of the base and tip, however, are shorter and narrower. Each pinna tapers to a very slender, rather deeply bifid, toothed tip that easily splits or frays.

The inflorescence is a large panicle of 5-9 rachillae 4 3/4 - 14 3/8 in. long, the lower of which are often forked, borne on a persistently brown-scurfy peduncle to 3 feet long. Staminate flowers are about 5/16 in. long with sepals 1/8 in. long and generally 35-38 stamens, though as few as 28 or as many as 40 have been recorded. Pistillate flowers are nearly as long as the staminate when fully developed with sepals 3/16 in. long. Staminodes are united to the petals for 3/32 in., then continue in short projecting filaments. The dark purple fruit is ovoid, 5/8 - 3/4 in. long, abruptly narrowed at the tip, and bears an oblong-ellipsoid, somewhat compressed seed 3/8 in. long, attached laterally along an impressed raphe. Endosperm is deeply ruminate.

Reinhardtia elegans has apparently never been cultivated. It inhabits the mountain forests of southern Oaxaca—north of Niltepec, on Cerro Caracol near Latani, Sierra San Pedro Nolasco, Talea, and the Cumbre de Teotalcingo—and mountains near Fenix in Chiapas, Mexico, at altitudes generally above 3,000 and up to 6,000 feet. Figure 4 shows a plant as drawn by Thornam for Liebmann's *Icones Palmarum* at Copenhagen with insert fruits added.

2. REINHARDTIA LATISECTA (figs. 2B, 3F).

Stems of *R. latisecta* are caespitose in clumps of 8-9, reaching a height of 26 ft., a diameter of 2 1/2 in. About 10 leaves with sheaths to 10 in. long are borne along the upper part of the stem. The spreading blades are 18-32 in. long, with persistently brown-scurfy wingless petioles 14-18 in. long and 2 broad several-nerved pinnae inserted 2 1/2 - 4 in. apart, sometimes with a 1-nerved slender pinna inserted between them. There are 21-24 nerves on each side of the rachis. The lower 7-9 - nerved pinnae curve toward the tip and measure to 25 in. long, 4 1/2 in. wide. The 14-15-nerved upper pinnae measure about 2 ft. long, 6 in. or more wide. They diverge from the rachis at an acute angle. The lower margin is longer than the upper, the outer margin obliquely and sharply toothed as is that of the lower pinnae.

Erect or arching inflorescences exceed the leaves in length with the brown peduncle 3 ft. long or more and the 15-19 simple or once-branched rachillae to 8 in. long or more. Staminate flowers have not been completely described but have 27 stamens according to Wendland, (or perhaps as few as 22 according to Burret). Fruit is black at maturity, similar to that of *R. elegans* in size, shape, and seed.

Reinhardtia latisecta has been described and illustrated as it grows in the Stann Creek Valley of British Honduras by M. A. Langlois in *Principes* 1:48-53, 1957. The original specimens were sent to Wendland by Kegel, a gardener at Halle, Germany, and were supposed to have come from Guatemala which then included British Honduras. There is no modern record for the species outside British Honduras where it also grows at Rio Grande and Middlesex. I do not know of it in cultivation.

The species is of unusual interest in that it has leaves with "windows" very much like those of *R. gracilis* but lacks the pale petiole. It has the size, inflorescence, and fruit of *R. elegans*. Thus it

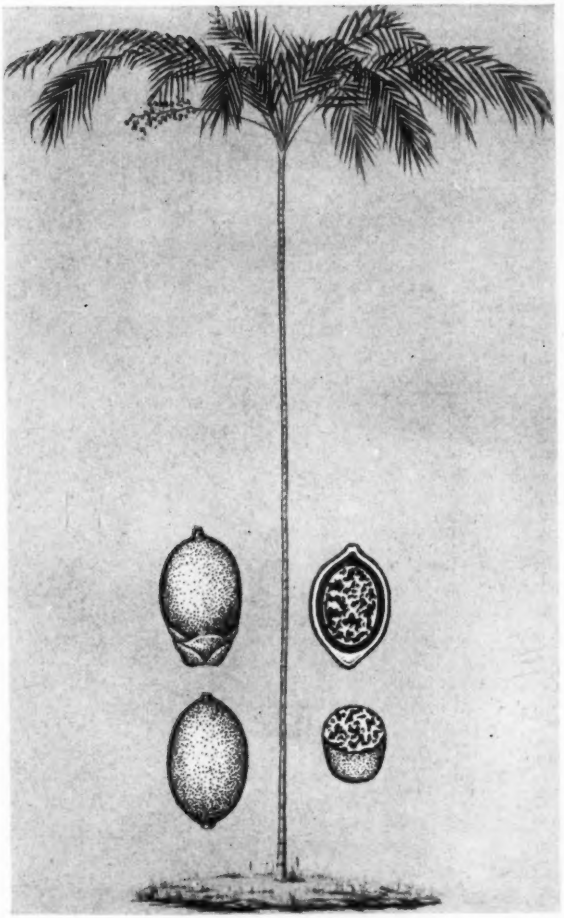

Fig. 4

REINHARDTIA ELEGANS.

Habit of plant as drawn for Liebmann's *Icones Palmarum* at Copenhagen with insert fruits added. (Reprinted from *Gentes Herbarum* 6:259, *fig. 137.* 1943.)

clearly connects these species formerly placed in two genera.

3. REINHARDTIA GRACILIS

The loosely to densely clustered or rarely solitary canelike stems of *R. gracilis* form attractive leafy masses up to 10 ft. high. Six to twenty leaves are borne along the upper part of the stem which is clothed with brown fibrous sheaths up to 6 in. long. A narrowly winged petiole 2 3/4 in. to 2 ft. long is pale below in age, though loosely brown-scurfy when young, and bears a small to large blade with generally 2, rarely 3-4, pinnae composed of segments united above the base but separated from each other by spaces or "windows" along the rachis. The short- to long-peduncled inflorescence bears 2-11 or more slender rachillae all of which may be simple or the lower forked or branched. Flowering nodes are borne in loose spirals or, in var. *rostrata*, in 2 ranks along the rachillae. Staminate

flowers 1/8 - 1/4 in. long have sepals 3/32 in. long or less and 8-22 stamens. Pistillate flowers are 5/32 - 3/16 in. long. The fruit is 1/2 - 5/8 in. long, generally tapered downward from a broad upper portion which is tipped with a low point or a prominent truncate crown. An ovoid basally attached seed has essentially homogeneous endosperm sometimes, however, with minute shallow intrusions.

The species is variable in its rather extensive range from southern Mexico to Costa Rica. It is divided into four varieties as indicated in the key on page 132. Three of these varieties have previously been described as species, a fourth is newly described. I have considered them as constituting a single species well differentiated from *R. simplex* and *R. Koschnyana* in the characteristic fenestrate or "windowed" leaf. Within *R. gracilis*, however, it is difficult to separate varieties on characteristics of the leaf, for these overlap, nor can they always be distinguished by their fruit. Staminate flowers are necessary before exact identification can be made. Although the varieties can be divided into two groups based on the number of stamens, the differences do not seem of specific importance when compared with the variation in number of stamens in other species, particularly in *R. simplex*. Perhaps it will someday be possible to arrive at a better understanding of the species through the use of experimental techniques.

Reinhardtia gracilis was cultivated in Europe and England before varietal differences were recognized. Plants illustrated in *Curtis's Botanical Magazine* 88: pl. 5291, 1862, and in *L'Illustration Horticole* 9: pl. 327, 1862, appear to have 9 stamens (though the text states that 10-12 are developed). The general aspect of the plants and their 4-nerved lower pinnae suggest that they represented var. *rostrata*, but without fruit one cannot be sure. Similarly, the plant figured as *Malortiea simplex* in *The Florist and Pomologist* 1873: 205, 1873, is probably the same.

Two varieties are probably grown in the United States today. R. G. Wilson has introduced var. *rostrata* from Costa Rica; David Barry has introduced what is probably var. *gracilior* from Mexico. I have not seen staminate flowers of the latter so cannot be sure of their identity until plants flower again.

R. GRACILIS, var. GRACILIS (figs. 1B, 2C, 3A, 6)

Variety *gracilis* is relatively large, approaching *R. latisecta* in size, with stems to 7 ft. high, 1/2 in. in diameter. Leaves have petioles 6 3/4 - 24 in. long and 14-22-nerved blades with a rachis 4 5/16 - 8 3/8 in. long. Lower pinnae are 4-7-nerved, to 10 in. long, 2 1/2 in. wide. Upper pinnae are 9-16-nerved, to 8 3/8 in. long on the lower margin and to 6 in. wide. The panicle consists of 6-11 rachillae nearly 1 ft. long, the lower often forked or branched, bearing 16-40 flowering nodes in a loose spiral. Staminate flowers 3/16 - 1/4 in. long have 17-22 stamens. Mature fruit is 9/16 - 5/8 in. long, 1/4 - 5/16 in. in diameter with a low apiculate crown.

Variety *gracilis* was first described from Guatemalan plants and has been collected several times in the Department of Izabal near Puerto Barrios. It also occurs in British Honduras at Pueblo Viejo, and in Honduras on the hills outside the United Fruit Company's station in Lancetilla near Tela, and on slopes of Mt. Cangrejal near the Danto River. The specimens from Honduras are larger than those from British Honduras and Guatemala. They have leaves with 17-22 nerves as opposed to 14-17 nerves, larger and more branched panicles with more numerous flowering nodes, but otherwise resemble the type of *R. gracilis*. I am not aware that either form of this variety is in cultivation.

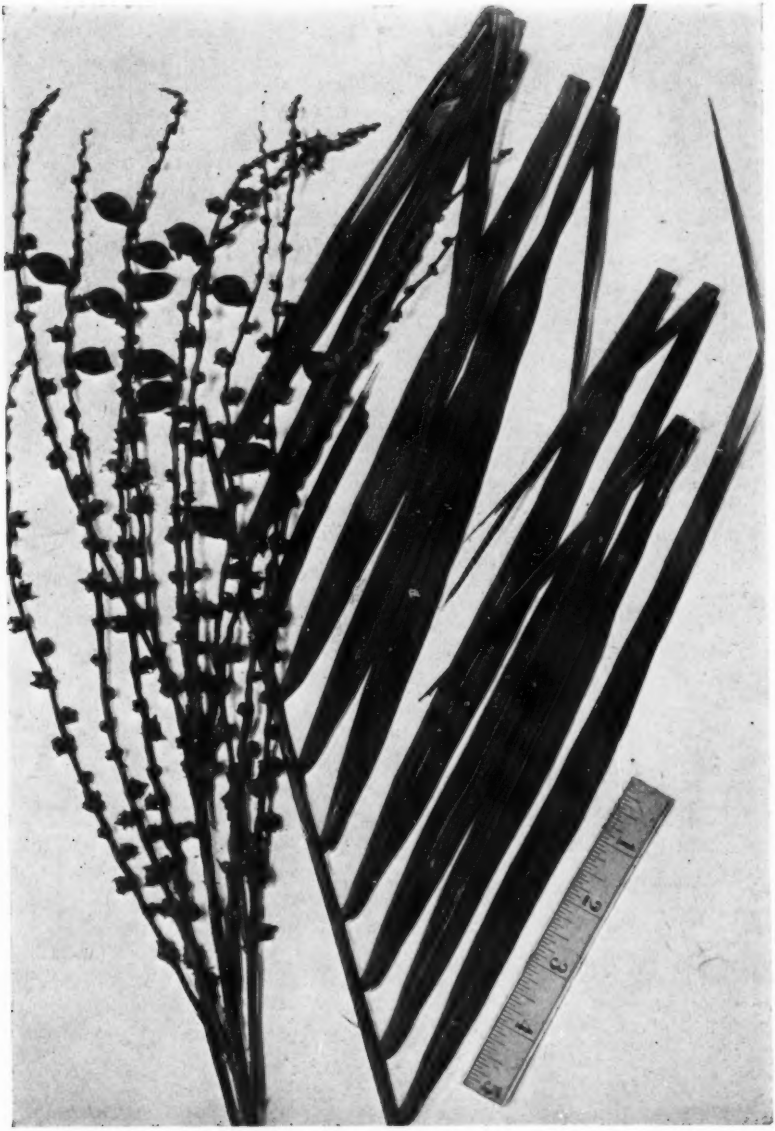

Fig. 5.

REINHARDTIA ELEGANS. Parts of a leaf and inflorescence in fruit somewhat less than 1/2 natural size. (Reprinted from *Gentes Herbarum* 8:190, *fig. 80.* 1949.)

Fig. 6.

REINHARDTIA GRACILIS var. GRACILIS. The specimen formerly in the herbarium at Hannover upon which Wendland based his description of *Malortiea gracilis*. Photograph by Macbride courtesy of the Chicago Natural History Museum.

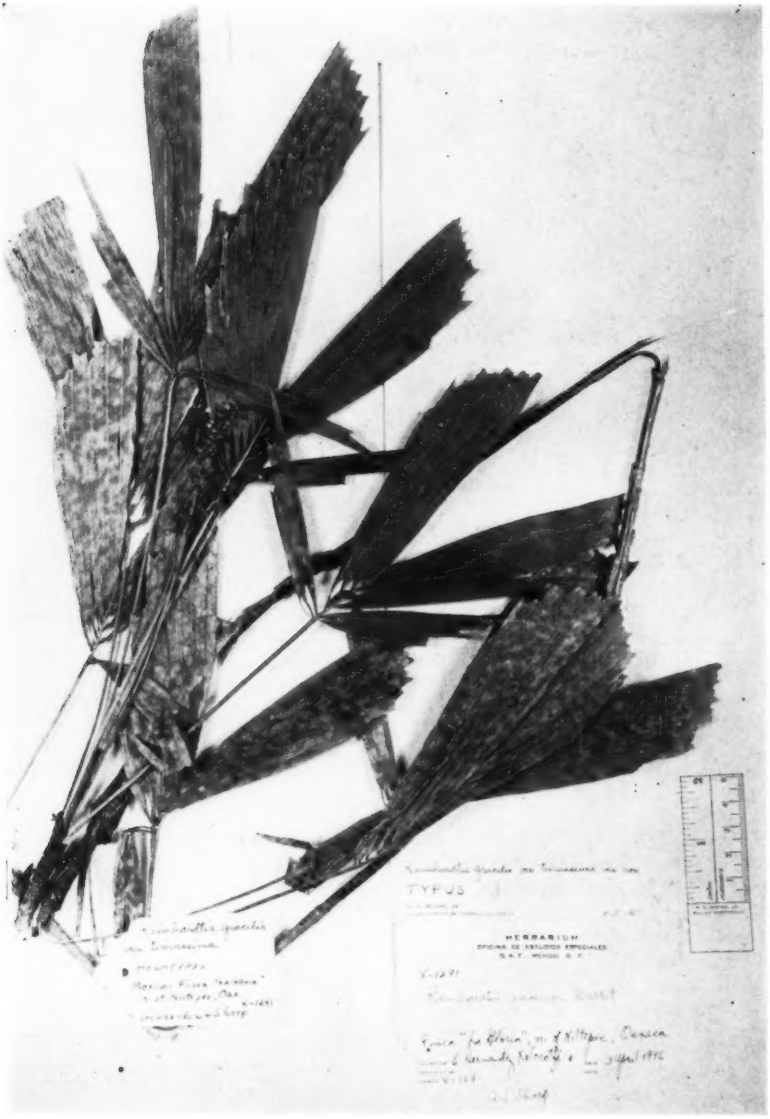

Fig. 7.

REINHARDTIA GRACILIS var. TENUISSIMA. The specimen in the Bailey Hortorium on which the variety is based.

R. GRACILIS var. TENUISSIMA (figs. 2D, 3B, 7).

Variety *tenuissima* differs from var. *gracilis* in its slender stems to about 3 ft. high, 3/16 in. in diameter and in its small leaves with only 8-9 nerves on each side of a rachis 1 3/8 - 2 3/16 in. long. Lower pinnae are 3-nerved, nearly 5 in. long, 11/16 in. wide. Upper pinnae are 5-6-nerved, to 4 1/2 in. long on the lower margin, 1 5/8 in. wide. The petiole measures 4 1/4 - 7 1/2 in. and has a short, loosely woven ligular structure at its base. Two to three slender simple rachillae 2 in. long with 8-17 spiralled flowering nodes make up the panicle. Staminate flowers are like those of var. *gracilis*, and fruit apparently resembles that of the var. *gracilior*.

Until flowers were studied, the specimens of var. *tenuissima* had been referred to var. *gracilior* which they resemble in size and leaf. The variety is known only from the wild state in the mountains of Oaxaca, Mexico, where it occurs north of Niltepec and near Tepinapa at altitudes of 3,000 feet or more.

R. GRACILIS var. GRACILIOR (figs. 2 E, 8).

Variety *gracilior* has a habit resembling that of var. *tenuissima* with stems to about 3 ft. high, 9/32 in. in diameter. Leaves have petioles to 9 7/8 in. long and are 8-11-nerved on each side of a rachis to 2 3/8 in. long. The lower pinnae are 3-4-nerved, to 4 3/4 in. long, 1 1/4 in. wide. Upper pinnae are 5-8-nerved, to 5 3/4 in. long on the lower margin, to 2 1/8 in. wide. The panicle has 3-8 slender rachillae to 3 5/16 in. long, the lower of which are sometimes forked, bearing 6-17 flowering nodes in a loose spiral. Staminate flowers to 5/32 in. long have 8-10 stamens. The fruit is 1/2 - 9/16 in. long, about 5/16 in. in diameter with a low apiculate crown.

Although variety *gracilior* resembles var. *tenuissima* in habit it differs in its staminate flowers and is found at low elevations from Veracruz and Oaxaca in Mexico, south to British Honduras at Stann Creek and Atlántida Department of Honduras.

I have seen it growing on the forested slopes above Zontecomapan between San Andres Tuxtla and the Atlantic Coast in Veracruz, Mexico, where it is associated with *Astrocaryum mexicanum*. The slender canes are inconspicuous in the tangled undergrowth but the bright fruiting inflorescences stand out against the green background. It is presumably this variety that is now grown in Florida and California.

R. GRACILIS var. ROSTRATA (figs. 1C, 2F).

Variety *rostrata* is variable. Stems are usually rather densely clustered, reaching a height of nearly 5 ft., a diameter of 9/16 in. Leaves have petioles 5 1/2-13 1/2 in. long, a rachis 1 1/2-4 1/2 in. long and generally 2 but rarely 3-4 pinnae. Lower pinnae are 3-5-nerved, 7 1/8 in. long, 1 3/4 in. wide. Upper pinnae are 8-10-nerved, to 7 1/8 in. long on the lower margin, to 3 3/4 in. wide. Rarely the upper pinnae are again partially or completely divided into several-nerved narrower segments of about the same length. The panicle has 2-6 simple rachillae to 5 3/4 in. long on which the 16-37 flowering nodes are borne in 2 nearly opposite ranks, at least above the base. Staminate flowers are about 1/8 in. long with 8-10 stamens. The mature fruit is about 1/2 in. long, 1/4 in. in diameter, and is tipped with a prominent truncate crown about 3/32 in. high.

Plants assigned to var. *rostrata* differ almost as much amongst themselves in regard to the leaf as do the various varieties of *R. gracilis*, though the inflorescence and fruit are relatively constant. Four forms are found near the coast and on higher ground inland from eastern Nicaragua south into eastern Costa Rica. These are not designated formally in a botanical sense for they cannot be distinguished by exact means. The typical form, that which was first described as *R. rostrata*, occurs in the lower reaches of the Reventazon River in Costa Rica and near the Ocong-

Fig. 8.

REINHARDTIA GRACILIS var. GRACILIOR. A plant growing along banks of the Coatzacoalcos River at Buenaventura, Veracruz, Mexico. Photograph courtesy Plant Introduction Section, U.S. Department of Agriculture.

was River in Nicaragua. It has large leaves with 2-3 pinnae and 11- mostly 13-15 nerves. Without the inflorescence, leaves would be easily confused with those of *R. gracilis* var. *gracilis*.

A second form from the San Carlos plains of Costa Rica has smaller leaves with 3-4 pinnae and 13-15 nerves on each side of the rachis. A third from the vicinity of Turrialba, Costa Rica, and Libertad, Nicaragua, at elevations of 1,500 feet or more has leaves much resembling those of var. *gracilior*, with 2 pinnae and 12-13 nerves. Finally, a fourth form from Río Luís and Pejivalle, Costa Rica, at altitudes of 2,300 to 3,000 feet has leaves scarcely separable from those of var. *tenuissima*.

The third form from the region of Turrialba (and often collected by botanists near the Inter-American Institute of Agricultural Sciences) has been introduced into cultivation recently. It may be the same as the one grown in Europe nearly a century ago.

4. REINHARDTIA SIMPLEX (figs. 2G, 3C, 9).

Stems of *R. simplex* are sometimes late-suckering and appear to be solitary but they ordinarily form clusters of a few slender canelike stems to 4 ft. high, about 1/4 in. in diameter, sheathed with 8-20 leaves in the upper portion. The leaf sheaths are to 3 1/8 in. long, the slender petioles to 6 1/2 in. long. These are pale and rounded below with a very narrow winglike margin, flat above, lightly brown-scurfy when young but soon only brown-dotted. Deep green leaf blades are either simple and 6 1/2-8 1/4 in. long, to 4 3/4 in. wide, 10-12 or rarely 8-nerved, or they have a pair of slender 3-4-nerved pinnae below the 7-8-nerved apex. When present, the lower pinnae are 4 3/4-6 in. long, to 1 9/16 in. wide and very obliquely toothed and tapered at the tip. The apex of the leaf is cleft only for 3/8-1 or rarely 1 1/2 in. Three to seven slender rachillae to 3 3/8 in. long are simple or rarely the lower are branched. They are borne at the end of a peduncle to 18 in. long and have 7-21 flowering nodes in a spiral. Staminate flowers 1/8-5/32 in. long have 12 or usually 14-19 stamens. The fruit is 1/2-9/16 in. long and is broadest near the tip where it is capped with a low apiculate crown. The oblong-ellipsoid seed has homogeneous endosperm.

Plate 5247 of *Curtis's Botanical Magazine* (1861) figures a plant of *Reinhardtia simplex* presented to Kew by Hermann Wendland, and probably brought by him from Costa Rica. Early in this century *R. simplex* was also grown on the Doheny Estate in California. A few plants grown from Costa Rican seeds are cultivated in Florida and Nassau but the species is undeservedly rare in cultivation. In the wild state, however, it is widely distributed at altitudes up to 2,300 feet but usually at less than 1,000 feet from Honduras and Nicaragua to Panamá. The habit is similar to that of *R. gracilis*. The small leaves lack "windows" along the rachis and, though generally with a pair of pinnae below the apical pair, sometimes resemble those of *R. Koschnyana* from which they are distinguished by the more numerous nerves and the very shallowly cleft apex.

5. REINHARDTIA KOSCHNYANA (figs. 2H, 3D, 10).

Several slender stems from a horizontal rhizome form a cluster 16-28 in. high, each stem clothed with brown fibrous sheaths scarcely exceeding 2 in. in length along the upper portion. The 6-14 leaves have a petiole to 4 3/4 in. long which is pale and rounded with narrowly winged margins beneath, and a small 8-9-nerved toothed blade to 9 in. long, 3 in. wide, lacking "windows" along the rachis, undivided except at the apex, where cleft for 1 3/4-2 3/8 or very rarely only 1 3/8 in. A slender spicate inflorescence has a flowering axis 2 3/8-3 1/2 in. long on which flowers are borne at 17-25 nodes. Staminate flowers measure about 1/8 in. long and have 8-10 stamens. Fruit is broadest near the tip, 7/16-1/2 in. long, 1/4-5/16 in. in diameter, with a low apiculate crown. The oblong-ellipsoid seed has homogeneous endosperm.

Reinhardtia Koschnyana is one of the most diminutive palms and for many years was known only from specimens collected in Costa Rica. It is now known to occur in Nicaragua, Panamá, and Colombia as well. The plants from Colombia have been called *Malortiea pumila* but study of a series of specimens shows them to be the same as *R. Koschnyana.*

The species is rarely encountered in the wild state and has not been reported in cultivation, though it surely deserves to be grown. In Nicaragua, *R. Koschnyana* has been found in Zelaya Department, in Costa Rica on the plains of San Carlos in Alajuela Province, in Panamá in Chepigana District of Darien Province, and in Colombia in Antioquia and Chocó Provinces.

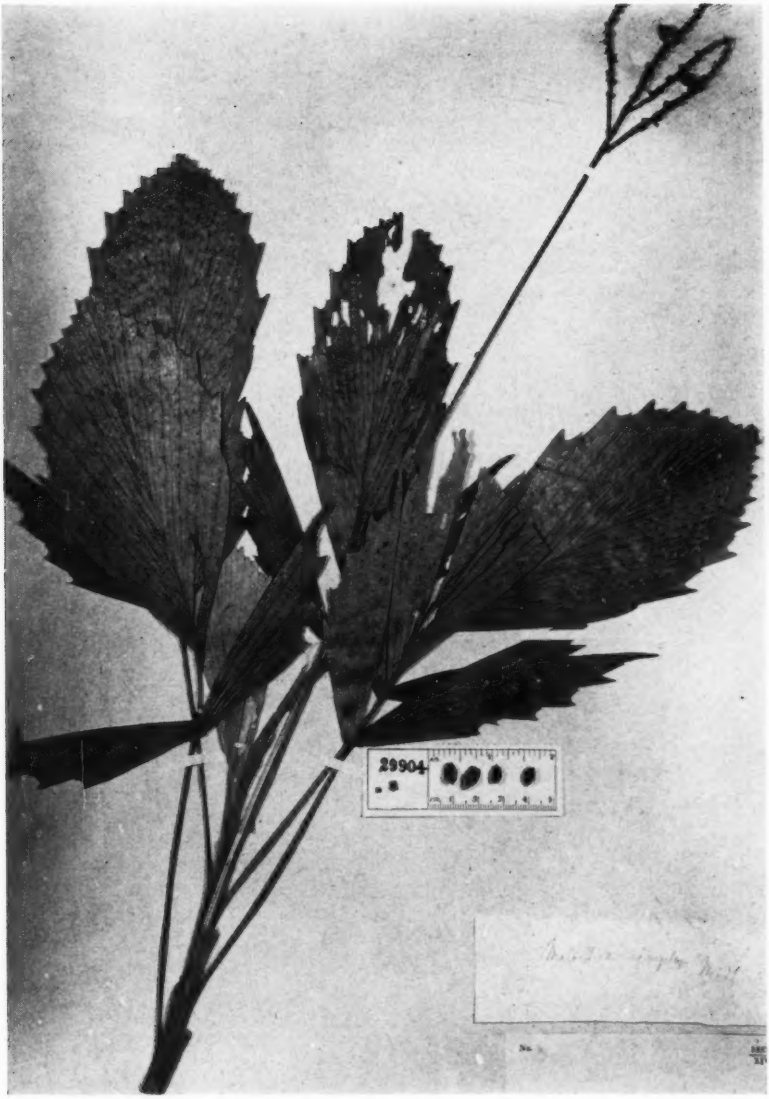

Fig. 9.

REINHARDTIA SIMPLEX. The specimen formerly in the herbarium at Vienna upon which Wendland based his description of *Malortiea simplex*. Photograph by Macbride, courtesy of the Chicago Natural History Museum.

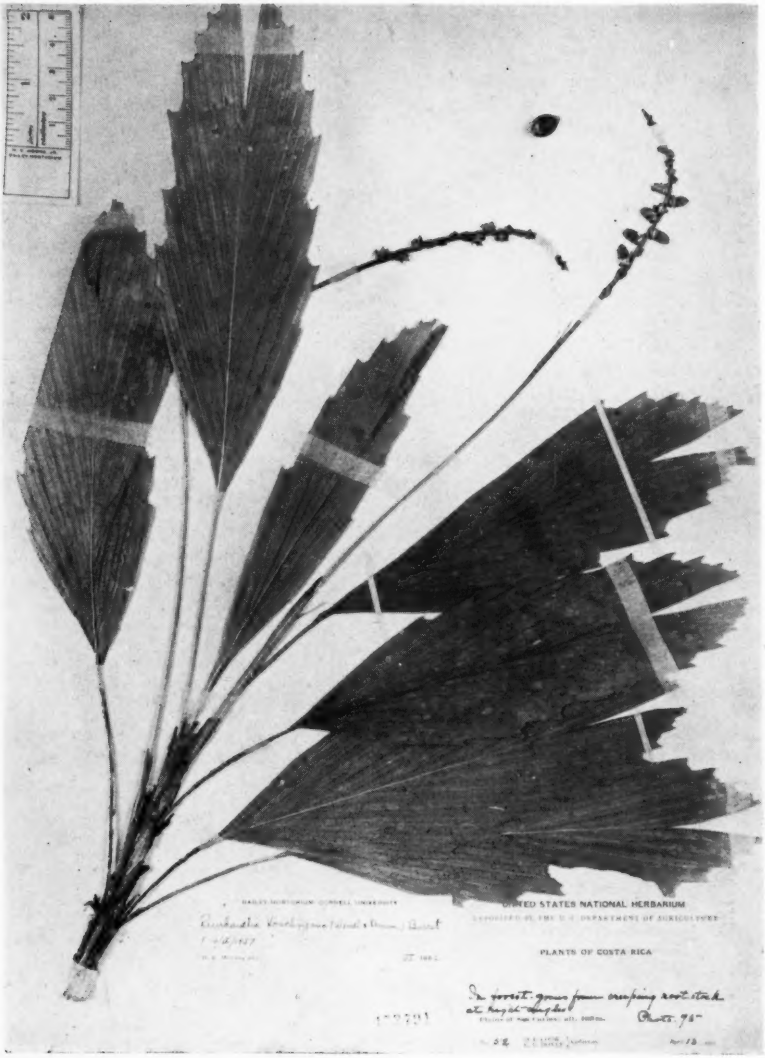

Fig. 10.

REINHARDTIA KOSCHNYANA. Photograph of a specimen now in the U.S. Natural Herbarium collected on the plains of San Carlos, Costa Rica, by Cook and Doyle in 1903.

Synonymy

The essential synonymy of the accepted species and varieties of *Reinhardtia,* including necessary transfers and description, is followed by a list of names or species that are no longer included in the genus.

REINHARDTIA Liebmann in Martius, Historia Naturalis Palmarum 3:311. 1849.

Malortiea H. Wendland, in Allgemeine Gartenzeitung 21:25, 145. 1853.

REINHARDTIA ELEGANS Liebmann, Loc. cit.

REINHARDTIA GRACILIS (H. Wendland) Burret, in Notizblatt des Botanischen Gartens Berlin 11:554. 1932.

REINHARDTIA GRACILIS var. GRACILIS

Malortiea gracilis H. Wendland, in Allgemeine Gartenzeitung 21:26, 146. 1853.

REINHARDTIA GRACILIS var. GRACILIOR (Burret) stat. nov.

Reinhardtia gracilior Burret, in Notizblatt des Botanischen Gartens Berlin 11:555. 1932.

REINHARDTIA GRACILIS var. ROSTRATA (Burret) stat. nov.

Reinhardtia rostrata Burret, in Notizblatt des Botanischen Gartens Berlin 11:554. 1932 [nomen] and in Annalen des Naturhistorischen Museums Wien 46:228. 1933.

Malortiea rostrata (Burret) L. H. Bailey, in Gentes Herbarum 6:260. 1943.

REINHARDTIA GRACILIS var. TENUISSIMA var. nov. Ab. var. *gracili* differt caulibus tenuibus foliis parvis 8-9-nervatis rachibus 3.5-5.5 cm. longis ligulis brevibus. Typus: Mexico; Oaxaca, Finca "La Gloria" north of Niltepec, 1,000-1,250 m. alt., Apr. 3, 1946, *E. Hernandez Xolocotzi* & *A. J. Sharp X-1291* (Bailey Hortorium).

REINHARDTIA KOSCHNYANA (H. Wendland & Dammer) Burret, in Notizblatt des Botanischen Gartens Berlin 11:554. 1932.

Malortiea Koschnyana H. Wendland & Dammer, in Gardeners' Chronicle, series 3, 29:341. 1901.

Malortiea pumila Dugand, in Revista de la Academia Colombiana de Ciencias Exactas, Fisico-Quimicas y Naturales 7:515. 1950.

REINHARDTIA LATISECTA (H. Wendland) Burret, in Notizblatt des Botanischen Gartens Berlin 11:554. 1932.

Malortiea latisecta H. Wendland, in Allgemeine Gartenzeitung 21:146. 1853.

REINHARDTIA SIMPLEX (H. Wendland) Burret, in Notizblatt des Botanischen Gartens Berlin 11:554. 1932.

Malortiea simplex H. Wendland, in Botanische Zeitung 17:5. 1859.

Excluded Species

Malortiea intermedia H. Wendland in Kerchove, Les Palmiers 250. 1878 [name only].

Malortiea lacerata H. Wendland in Kerchove, Les Palmiers 250. 1878 [name only].

Malortiea simiarum Standley & L. O. Williams, in Ceiba 3:102. 1952=*Euterpe simiarum* (Standley & L. O. Williams) tr. nov.

Malortiea speciosa Hort. ex. H. Wendland in Kerchove, Les Palmiers 250. 1878 [name only].

Malortiea Tuerckheimii Dammer, in Notizblatt des Botanischen Gartens Berlin 4:157. 1904 & 259. 1906= *Chamaedorea Tuerckheimii* (Dammer) Burret.

Reinhardtia spinigera L. H. Bailey, in Gentes Herbarum 8:191. 1949. Rejected species based on a mixed collection, the leaves of which belong to a species of *Bactris,* the inflorescence to *Reinhardtia elegans.*

How Old Are the Palms?

ARTHUR J. EAMES

The palms stand apart from other flowering plants in many ways, perhaps most conspicuously in the unbranched habit of most species and in their enormous leaves. Technically, the method of origin of the compound leaf distinguishes them from other plants with compound leaves. (The leaflets are formed by a splitting of the leaf primordium when it is only 1-2 mm. long, not, as commonly supposed, by a splitting apart as the leaf unfolds.)

The unusual appearance of the large palm trees and their restriction to tropical and subtropical regions, suggests that the palms, like other unusual and bizarre plants and animals, may belong to another era; that they are perhaps primitive and therefore old in geological time. L. H. Bailey, who spent many years living with palms in the field and in the herbarium, has called the palms "an old kind of vegetation in the geological sense" and the leaf an "archaic type." One who has lived so long and so intimately with a group of plants comes to have an instinctive acquaintance with hidden aspects of the life and history of those plants. Further, the main lines of varied and high specialization in the palms in habit, leaf type, inflorescence, flower, and fruit point to a very long period of existence for the family.

Studies of leaf-form show that the pinnate leaf is the primitive type, the palmate the advanced type. The palmate leaf is a "telescoped" form of the pinnate. This is seen even superficially in the shortened, condensed rachis of the palmate type; the crumpled condition of the tissues in the hastula is often obvious even to the naked eye, and the crumpling appears to have occurred in some forms during the ontogeny of the leaf. The costa-palmate type—a term given by Dr. Bailey—is intermediate between the pinnate and palmate types; in this type the leaf frond has been reduced and shortened but a strong midrib—the rachis of the pinnate leaf—persists as a costa. So strong a modification of leaf type also suggests old age for the family.

Fifty years ago a French morphologist, Lignier, described fossil palm leaves (*Propalmophyllum*) from Liassic strata in France. Accompanving these imprints of leaves, which bear very close resemblance to leaves of living palms of the costa-palmate type, is a typical Jurassic flora of gymnosperms and lower groups. Because at the time these leaves were described, angiosperms (flowering plants) were not known before the Lower Cretaceous. the identification of these fossil palmlike leaves as true palms was questioned. But the imprints closely match the leaves of living palms and since the fossil plant remains found with the palm-leaf remains are definitely Jurassic, the fossils can hardly be considered other than a very early record for the palms and for angiosperms generally. In recent years, more and more evidence that the angiosperms existed in the Jurassic period has been accumulating in the form of wood and pollen grains. And evidence of the existence of palms even in the Triassic has been found by Dr. Roland W. Brown of the United States Geological Survey. These fossils are not imprints of leaves but a fossil stem-tip with leaves. If the identification of this plant as a palm is confirmed, the palms are indeed very old—perhaps 40 million years—and are the oldest angiosperms of which we have certain evidence from leaf fossils. So great an age does not seem so remarkable now as it did fifty or even twenty or ten years ago, for students of phylo-

geny and morphology are beginning to recognize that the angiosperms must have already been very old by Lower Cretaceous times. The palms, it seems, probably represent one of the oldest major groups of angiosperms living today. The palm tree may perhaps mean more to us than a plant of magnificent form and stately beauty but an example of a tree that has lived very long and is reminiscent of long ages past when flowering plants were "growing-up" to be a dominant element in the plant world.

Chamaedorea Radicalis

An unidentified palm, seed of which had been inadvertently introduced with that of *Collinia elegans* from Mexico, was flowering and fruiting at the Fairchild Tropical Garden and at Vero Beach, Florida, when I visited there this spring. The species had a familiar look and was tentatively identified as *Chamaedorea radicalis*. Thanks to the kindness of Edwin Johnston, Stanley Kiem, and Nat De Leon, who provided study material of mature fruit and of both sexes in flower, this determination is confirmed.

Chamaedorea radicalis occurs in eastern Mexico from the mountains of Tamaulipas south into Hidalgo so far as is known. It was described in 1849 by Martius who had received specimens collected by Karwinski, perhaps from the same place on the road from Victoria to Jamauve in Tamaulipas where it may be found today. I have seen it growing there together with *Brahea Berlandieri* and *Brahea Moorei* in the shade of oak forest and again, with the same two species, in oak-cedar woods on the trail from Jacala to Barranca de Tepetates in the state of Hidalgo not far from the Pan-American Highway. Specimens collected at Tamosopo Canyon in the state of San Luis Potosí were given the name *Chamaedorea Pringlei* by Sereno Watson in 1891 but prove to be the same as the earlier *C. radicalis*.

Stems of this species are ordinarily very short and for the most part underground or lying on the ground though plants are said to reach a height of six feet on occasion. In nature the species did not appear to sucker freely but plants in cultivation are starting to produce additional crowns. Several leaves to three feet long with 10-18 pairs of slender dark green pinnae to 14 inches long, 3/4 inch wide are rather stiffly erect, arching toward the tip. The inflorescences rise from outside the outer leaves. Their long peduncles nearly equal the leaves and are sheathed with papery brown tubular bracts. Rachillae may be only one (frequently so in female plants) to as many as nine but are most often two or three. The deep green flowers of male plants are borne in lines of 2-3 in close proximity spiralled about the rachilla while flowers of the female plants are always solitary and spiraled. Fruit is about 3/8 inch in diameter, at first green but eventually becoming bright orange-red.

Although *Chamaedorea radicalis* is a coarser species than *Collinia elegans* it may prove more adaptable to Florida conditions due to its preference for limestone areas and its presumed ability to withstand drier conditions than species from the moister forests.

H.E.M.

Zombia Antillarum

NAT J. DE LEON

Of all the palms known to me in cultivation in South Florida, *Zombia antillarum* Bailey must stand out as being the most unusual of palms. Its small stature, interesting habit, and individual beauty certainly warrant its wider cultivation.

Zombia antillarum was introduced by the United States Plant Introduction Garden, Coconut Grove, in 1927 from seeds collected by O. F. Cook in Haiti. In its natural habitat it is found growing in isolated clumps on high slopes of hills and in secondary forest growth. The several areas where *Zombia* are found are exceedingly hot and dry. It is closely allied to the *Coccothrinax* group and is the only true clustering palm of the subtribe *Thrinacinae* in which it belongs.

Its main attraction is the sleeve which completely encloses the trunks. The loose sleeve is the result of persisting leaf-sheaths described by Dr. Bailey as of "open-woven structure whose strands at the top make a formidable row of down-

Photo by H. F. Loomis

ZOMBIA ANTILLARUM in dry forest, Gras Morne, Haiti. Photograph courtesy Plant Introduction Section, U.S.D.A.

Photo by H. F. Loomis

ARMED LEAF SHEATHS OF *ZOMBIA ANTILLARUM*, Gras Morne, Haiti. Photograph courtesy Plant Introduction Section, U.S.D.A.

Photo by H. F. Loomis

FRUIT OF *ZOMBIA ANTILLARUM* as it grows at the U.S. Plant Introduction Garden, Coconut Grove, Florida. (Reprinted from *Gentes Herbarum* 4:244, *fig. 157.* 1939.)

ward-pointing spines." The whole sleeve gives the appearance of being woven by a craftsman.

Zombia is a small-growing cluster palm, the trunks reaching a height of ten feet or more. Its leaves are fan shaped, small, dull green above, and silvery beneath, the leaf segments on mature leaves being cut one-half to two-thirds to the base. Dead leaves are soon shed from the trunks. In June it sends out a somewhat erect inflorescence which eventuallv arches out under the weight of its fruits. The fruits are white at maturity in late August, varying from one-half to three-quarters of an inch in diameter, and are somewhat bilobed. It is also quite shade tolerant but, as with other clustering palms, more offshoots are produced in open locations than under shaded conditions and these grow more rapidly.

Several botanical treatments have been given this palm, the most complete being by Dr. Bailey in *Gentes Herbarum*, Volume 4, Fascicle 7, and by O. F. Cook under the name of *Oothrinax anomala*, in *The National Horticultural Magazine*, January, 1941. It is interesting to compare this palm as it grows in the wild with those growing under cultivation. I have seen photos and have spoken to persons who have seen *Zombia* in Haiti. There its appearance is straggly, while under good cultural practices it takes on handsome proportions. This seems to hold true for a number of palms growing under adverse conditions. Both treatments of *Zombia* describe it as sending up only two or three trunks at a time, arising from the slender shoots. Yet the oldest plant at the United States Plant Introduction Garden has five trunks over six feet tall, and some seven more varying in height from one to six feet tall. It has also been described as sending up a mound of superficial roots to one foot high, while under cultivation these roots are not very noticeable. Specimens under cultivation will also hold more leaves and are more prolific fruiters.

The main objection to *Zombia antillarum* is its slowness of growth in the juvenile stage, but such a handsome and unusual palm is certainly worth waiting for.

PALM LITERATURE NOTED

Eames, A. J. Neglected Morphology of the Palm Leaf. Phytomorphology 3: 172-189. 1953.

Lignier, O. Nouvelles recherches sur le *Propalmophyllum liasicum*. Société linnéenne de Normandie, Caen, Mémoires 23:1-15. 1907. [French]

Beccari, O. & Pichi-Sermolli, R.E.G. Subfamiliae Arecoidearum Palmae Gerontogeae Tribuum et Generum Conspectus. Webbia 11:1-187, f. 1-47. 1955. [Latin and Italian]

William W. Hargert

It is with regret that we must announce the passing of another of the Palm Society's first members. William W. Hargert, husband of Claire Hargert, our first Secretary, died very suddenly on April 8th of this year. A prominent insurance man of Ridgewood, N. J., Mr. Hargert was semi-retired, living most of the year in Ormond Beach, Fla. An avid gardener, he had built up there an extraordinary collection of tropical and semi-tropical plants, including some fine palms. The Society will miss one of its most enthusiastic supporters. To Mrs. Hargert we extend our deepest sympathy.

Wanted • For Sale • Exchange

This advertising is restricted to members of the Society or to firms having a member of it in their organization. Two nurseries have reported very substantial sales of palms directly resulting from ads in PRINCIPES. Ads for the next issue must be received by August 15, 1957. Please confine copy to matter bearing on the palms. Rates: 25c a line or part of a line, straight-run, $1 minimum charge. Kindly remit to the Treasurer, *after* publication, counting the lines to determine the charge.

Rhyticocos amara, Dominican Palm. Strong plants in gal. cans, 15-18 inches high, $5.00 postpaid in Florida, extra for longer distances. We have several other interesting items. Write or come see us. Reasoner's Tropical Nurseries, P. O. Box 828, Bradenton, Fla.

Numerous kinds of palms, large and small. U.S. certified free from Mediterranean Fruit Fly and Burrowing Nematodes. Send for list with sizes, prices. Smith's Nursery, P. O. Box 508, Oakland Park, Fla.

Wanted to buy: One 4 to 8-year-old *Heterospathe elata*; also seedlings or older plants of *Livistona decipiens, L. Jenkinsiana, L. Mariae, Copernicia gigas, Syagrus insignis. Kentia australis. Reinhardtia elegans. Nannorhops Ritchieana.* Dent Smith, 2514 S. Peninsula Drive, Daytona Beach, Florida.

Mauritia setigera & flexuosa, 5-qt. cans. *Loxococcus rupicola*, qt. cans. *Hyphaene thebaica*, 5-qt. cans, true branching palm. *Corypha elata & umbraculifera*, gal. cans. *Arenga pinnata, tremula, Engleri, obtusifolia.* Many others. No shipping. Vero Beach Tropical Garden and Nursery, Box 974, Vero Beach, Fla.

Wish to buy plants of *Arenga ambong* and *Cryosophila argentea.* Nat J. De Leon, 8300 S.W. 62nd Place, Miami 43, Florida.

Wish to buy 3-4 ft. *Caryota Cuminsgii.* Also want a few seeds (up to 20) of any *Chamaedorea* EXCEPT *erumpens, stolonifera, Seifrizii.* Mrs. L. H. Wait, 7229 S.W. 54th Ave., Miami 43, Fla.

Small sized *Phoenix zeylanica* in pots may be obtained free, courtesy of the Florida State Federation of Garden Clubs. Palm Society members may pick them up at the home of Mrs. W. C. Knox, 649 Isle of Palms, or of Mr. D. J. McSwiney, 401 S.W. 14th Ave., Fort Lauderdale, Fla. No shipping.

Fresh palm seeds for sale. *Chamaerops excelsa*, $4.00 per lb.; *Erythea armata* (Blue Palm) $9.50 per 1000; *Erythea edulis* $7.00 per 1000; *Washingtonia filifera* $3.50 per lb. Prices are less for large amounts and somewhat more for small amounts. Prices are F.O.B. Willing to trade for other seed, especially *Phoenix reclinata* and *Roebelenii, Oreodoxa regia, Caryota, Rhapis, Sabal, Thrinax, Pritchardia*, and others. Don Forbes, 2883 - 220 Place, Long Beach 10, Calif.

PALMS OF MADAGASCAR, one volume in the series: "Flora of Madagascar and the Comores," by Humbert et al, paper bound, 186 pp., many line drawings, $4.50; may be ordered from E. A. Menninger, Stuart, Fla.

A PLANT OF *REINHARDTIA GRACILIS* variety *ROSTRATA* at Longwood Gardens with an inflorescence just beraking through the enclosing bracts. The stem is 15 to 20 inches high, with a new shoot starting at the base. Longwood Gardens photo by G. Hampfler.